

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1-24. (Cancelled)

25. (Currently Amended) A hydrogen energy system comprising:

- (a) a hydrogen generator for generating hydrogen by water electrolysis using from electricity electrical energy received from at least one source of electric energy; and
- (b) a hydrogen storage apparatus for storing at least some of the hydrogen generated by said hydrogen generator; and
- (c) a controller having a computer processor for receiving and processing control inputs including data concerning the availability of electrical energy for use by said hydrogen generator said at least one source of electric energy, said controller being operatively connected to said hydrogen generator for controlling the generation of hydrogen based at least in part upon said control inputs.

26. (Cancelled)

27. (Cancelled)

28. (Cancelled)

29. (Currently Amended) A system as claimed in claim ~~28~~ 25 wherein said controller further receives and processes data concerning said hydrogen storage apparatus.

30. (Cancelled)

31. (Currently Amended) A system as claimed in claim ~~30~~ 25 wherein said controller inputs further include data concerning said hydrogen generator.

32. (Currently Amended) A system as claimed in claim ~~30~~ 25 wherein said controller inputs further include data concerning hydrogen demand.

33. (Currently Amended) A system as claimed in claim ~~30~~25 ~~further comprising a hydrogen storage apparatus for storing at least some of the hydrogen generated by said hydrogen generator and wherein said controller inputs further include data concerning said hydrogen storage apparatus.~~

34. (Currently Amended) A system as claimed in claim ~~33~~25 wherein said controller further controls the storage of hydrogen.

35. (Original) A system as claimed in claim 25 further comprising a compressor for compressing said hydrogen to a minimum desired pressure.

36. (Cancelled)

37. (Currently Amended) A system as claimed in claim ~~36~~35 wherein said hydrogen is compressed by said compressor prior to storage in said hydrogen storage apparatus

38. (Original) A system as claimed in claim 35 wherein said controller controls the generation, compression and storage of hydrogen.

39. (Original) A system as claimed in claim 25 wherein said hydrogen generator generates hydrogen at a minimum desired pressure.

40. (Currently Amended) A system as claimed in claim ~~28~~25 further comprising a hydrogen delivery system for delivering hydrogen from at least one of said hydrogen generator and said hydrogen storage apparatus to a hydrogen user.

41. (Original) A system as claimed in claim 40 wherein said hydrogen user is a hydrogen conversion device for powering a vehicle.

42. (Currently Amended) A system as claimed in claim ~~28~~25 further comprising a hydrogen conversion device for receiving hydrogen from ~~at least one of said hydrogen generator and said hydrogen storage device~~ apparatus and converting said hydrogen into electricity.

43. (Original) A system as claimed in claim 42 wherein said hydrogen conversion device is an internal combustion engine.

44. (Original) A system as claimed in claim 42 wherein said hydrogen conversion device is a fuel cell.

45. (Currently Amended) A system as claimed in claim 2825 further comprising a hydrogen conversion device for receiving hydrogen from ~~at least one of said hydrogen generator and said~~ hydrogen storage apparatus and converting said hydrogen into thermal energy.

46. (Original) A system as claimed in claim 25 wherein said at least one source of electric energy includes an electricity grid.

47. (Original) A system as claimed in claim 46 wherein electricity for said electricity grid is produced by a plurality of primary energy resources.

48. (Original) A system as claimed in claim 47 wherein said primary energy resources include renewable resources.

49. (Original) A system as claimed in claim 47 wherein said primary energy resources include at least one of the following: fossil fuels, wind, solar, nuclear and hydro.

50. (Currently Amended) A system as claimed in claim 25 wherein said energy ~~source~~ availability data includes real time data.

51. (Cancelled)

52. (Currently Amended) A system as claimed in claim 25 wherein said energy ~~source~~ availability data includes ~~forecasted~~ stored data.

53. (Currently Amended) A system as claimed in claim 25 wherein said energy ~~source~~ availability data includes energy cost data.

54. (Currently Amended) A system as claimed in claim 3025 wherein said controller modulates the generation of hydrogen by said hydrogen generator based on data including said energy ~~source~~ availability data.

55. (Currently Amended) A system as claimed in claim 42 wherein said controller modulates the generation of electricity by said hydrogen conversion device based on data including said energy source availability data.

56. (Original) A system as claimed in claim 55 wherein at least some of said electricity generated by said hydrogen conversion device is transmitted to an electricity grid.

57. (Original) A system according to claim 25 wherein said at least one source of electric energy includes at least one non-grid source of electric energy.

58. (Original) A system as claimed in claim 57 wherein electricity for said at least one non-grid source of electric energy is produced by at least one primary energy resource.

59. (Original) A system as claimed in claim 58 wherein said at least one primary energy resource includes renewable resources.

60. (Original) A system as claimed in claim 59 wherein said renewable resources include at least one of wind, solar, and hydro.

61. (Original) A system as claimed in claim 57 wherein said primary energy resources include at least one of the following: fossil fuels, wind, solar, nuclear and hydro.

62. (Currently Amended) A system as claimed in claim ~~30~~25 wherein said at least one source of electric energy includes an electricity grid and at least one non-grid source of electric energy and wherein said controller selects one of said at least one sources of electric energy based on data including said energy source availability data.

63. (Original) A system as claimed in claim 62 further comprising a device for converting hydrogen into electricity.

64. (Currently Amended) A system as claimed in claim 63 wherein said controller modulates the generation of electricity by said hydrogen conversion device based on data including said energy source availability data.

65. (Original) A system as claimed in claim 64 wherein at least some of said electricity generated by said hydrogen conversion device is transmitted to said electricity grid.
66. (Currently Amended) A system as claimed in claim 25 wherein said energy ~~source~~ availability data includes data pertaining to ~~emissions associated with the~~ the type of primary energy resources used for producing said electricity.
67. (Currently Amended) A system as claimed in claim 25 wherein said energy ~~source~~ availability data includes data pertaining to credits awarded for use of certain energy sources.
68. (Cancelled)
69. (Currently Amended) A system as claimed in claim ~~2829~~ wherein said controller initiates operation of said hydrogen generator to generate hydrogen when the amount of hydrogen stored in said hydrogen storage apparatus falls below a predetermined amount.
70. (Currently Amended) A system as claimed in claim ~~2825~~ wherein said hydrogen storage apparatus comprises at least one hydride storage chamber.
71. (Currently Amended) A system as claimed in claim ~~2825~~ wherein said hydrogen storage apparatus comprises at least one container for storing pressurized hydrogen.
72. (Original) A system as claimed in claim 25 wherein said controller controls the amount of electricity received by said hydrogen generator.
73. (Original) A system as claimed in claim 25 wherein said controller controls the duration of electricity supply to said hydrogen generator.
74. (Currently Amended) A system as claimed in claim 25 wherein said controller comprises a ~~single~~ plurality of controllers.
75. (Cancelled)
76. (Cancelled)

77. (Original) A system as claimed in claim 25 wherein said data is transmitted to said controller using the same wires that are used to deliver said electricity.

78. (Original) A system as claimed in claim 25 wherein said data is transmitted to said controller by wireless transmission.

79. (Currently Amended) A hydrogen energy system comprising:

- (a) a hydrogen generator for generating hydrogen ~~from~~ by water electrolysis using electrical energy received from at least one electrical energy source;
- (b) a hydrogen storage apparatus for storing at least some of the hydrogen generated by said hydrogen generator;
- ~~(c)~~ ~~a data processor including a hydrogen generator data processor for processing data concerning said hydrogen generator, a hydrogen storage data processor for processing data concerning said hydrogen storage apparatus, a hydrogen demand data processor for processing data concerning hydrogen demand and an energy source data processor for processing data concerning said at least one source of electric energy; and~~
- ~~(c)(d)~~ a controller ~~for controlling the generation and storage of hydrogen based on inputs including inputs received from said data processor~~ having a computer processor for receiving and processing control inputs including data concerning one or more demands for hydrogen, said controller being operatively connected to said hydrogen generator for controlling the generation of hydrogen based at least in part upon said control inputs.

80. (Original) A system as claimed in claim 79 further comprising a compressor for compressing said hydrogen to a minimum desired pressure.

81. (Original) A system as claimed in claim 79 further comprising a device for converting hydrogen into electricity.

82. (New) A hydrogen energy system comprising:

- (a) a hydrogen generator for generating hydrogen by water electrolysis using electrical energy received from at least one source of electric energy;
- (b) a hydrogen storage apparatus for storing at least some of the hydrogen generated by said hydrogen generator; and
- (c) a controller having a computer processor for receiving and processing control inputs including data concerning the price of electrical energy available for use by said hydrogen generator, said controller being operatively connected to said hydrogen generator for controlling the generation of hydrogen based at least in part upon said control inputs.